

# Metallurgy In Medieval Assam: A Study With Special Reference To Gold Washing And Iron Smelting Technology

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**Abstract:** The history of culture and civilization is closely linked to the story of the use of metals includes gold, iron, copper, silver, lead and mercury. In fact, Assam has a very traditional metal technology as indicated by iron smelting and gold washing technology in the medieval period. Moreover, in the medieval Assam, the people generally used native metals which could easily smelted from ores. The Ahom ruler of Assam was ardently interested in exploring new prospects for commerce and revenue. Assam's abundant resources for iron and gold production received their attention. They encouraged traditional smelters for develop traditional metal technologies. Therefore, this paper focuses on the high status of traditional gold washing and iron smelting technology in the medieval Assam.

**Index Terms:** Assam, Copper, Gold, Iron, Metal, Traditional, Technology.

## 1. INTRODUCTION

Metallurgy is a study of materials science and engineering that focus on the physical and chemical behavior of metallic elements. It is also the technology of metals. Historical development of metallurgy science can be found in the past civilization and culture like ancient Egypt, ancient and medieval China, ancient and medieval India culture. Many applications and technology such as cast iron, blast furnace, gold washing and double acting piston bellows were associated with the metallurgy science. Undoubtedly, metallurgy had a close relationship with the human civilization and also concerned with the production of metallic components for use in daily activities of human society. Similarly, Assam has a very old metal technology tradition as indicated by iron smelting and gold washing technology in the medieval period. All these are proof that the metallurgical technology of medieval Assam was rich and vast. The detailed description of craft technology in the literature was another proof of the high level of knowledge of metallurgy science in the medieval Assam. The Assamese knew the process of metallurgy technology by mixing different metals. They used metals such as gold, silver, copper and iron. The paper discusses the knowledge of metallurgy science of Assamese people during the medieval period with special reference the technology of iron smelting and gold washing technology.

## 2. METHODOLOGY

The present study is mainly based on descriptive and scientific analytical method. The study has also carried out to understand the metal technology development in the medieval Assam. The study has mainly based on primary and the secondary source. Primary data has been collected from the archival documents and Government reports. Meanwhile, the secondary data has been collected from published books, articles, reports, Gazetteers and research works. However, the study area is mainly confined to Medieval Assam from 1228 to 1838.

It is interesting to note that Assam's most notable achievement in metallurgy technology has been in the field of iron and gold. Medieval Assam produced two important metals, gold and iron (Baruah, 1995). The local people of Assam, particularly hill tribes traditionally developed the metallurgy technologies of iron smelting and gold washing in the medieval period. They had developed various metallurgical technologies. During the medieval period, the metal casting technology reached a high degree of proficiency. Different kind of articles were manufactured of gold, iron, silver, bell-metal and copper. Moreover, several professional social communities like Sonaries, Kanhars, Moriyas, Sonowals, Kamars etc. closely associated with the metallurgy technology. In the medieval period, there grew up in Assam different industries dealing with metals like gold, silver, iron, copper, bell-metal. Lead etc (Rajguru, 1988).

### 3.1. Gold Washing Technology

Among the important metal technology of the medieval Assam, gold was the most important one. It is interesting to note here that gold dusts were found in the sands of several rivers of Assam during the medieval period. Moreover, many writers have discussed the process of gold washing in Assam. One of important earliest reference to gold washing in ancient Assam is found in the Arthasastra. Similarly, it is found in the Silimpur inscription that the kings of early Kamrupa used to mint gold coins, though, unfortunately, no such gold coins have yet discovered (Chowdhury, 1966). Shihabuddin Talish mentioned that Sonowals were mainly engaged in the process of gold washing during the medieval period. Gold washing was the main occupation of the Sonowal pykes but other community pykes also joined with them and received their shares. The gold was washed for in all streams during the Assamese calendar months of Maug, Falgoon and Choit. It is interesting to note that the method of gold washing was very crude. The process of gold washing was mainly done during the winter season. In fact, the rivers, which were composed of small rounded pebbles, consisting of quartz and sandstone with a considerable mixture of sand were preferred for the gold washing purpose (Baruah, 1995). According to Scott, Gold dust was mainly found in conjunction with iron dust in the rivers. Hence, gold dust

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had to be separated by repeated washing and its trituration with mercury (Gohain, 1992). The purity of gold had to be examined by submerging it in water. If the gold lump sank immediately in water, it was accepted as pure, as impurity would make the lump float in water. If the gold was brass colour, it was wrapped in a paste made of clay from the cooking choolas (i.e., completely burnt earth) and salt water and burnt in fire to give a glitter (Baruah, 1995). The important rivers from which huge amount of gold were harvested during the medieval Assam:

1. Luhit, 2. Dihing, 3. Sonsiri, 4. Jongloong,
5. Tengapanee, 6. Mansiri, 7. Roydeng
8. Chidang, 9. Khoroi, 10. Digaru, 11. Dibang, 12. Dhonsiri,
13. Borgang, 14. Poma

### 3.2. Iron Smelting Technology

Assam also produced a high quality of iron in the medieval period. Iron ores mostly found in upper Assam. Several iron mines were found in the area from Jaipur to Bacha-Dayang region in the present border of Assam and Nagaland. It is found that Tirupather, Hatigarh and Kacharihat also produced best quality of iron in Assam during the medieval period. Reference of iron ore was mainly found in the account of Oldham. He stated that the best quality of iron ore was deposited in the Khasi hills. It may be noted that the Ahom King Sukapha had established villages of iron smelters in the bank of Dekhow rivers. Several remains of iron furnaces has been still seen here. Similarly, the biographical work, entitled "Katha-guru-charita" has clearly indicated the existence of iron ore in the Koch Kingdom. Hamilton also stated that iron hoes amounting to Rs. 600/- were exported from Assam in the medieval period (Hamilton, 1963).

Under the Ahom Government, there were batches of people to work in the iron mines; every unit or batch consisted of

one Ojah (head) and four Palis (assistants). Such a batch could produce iron weighting about one maund and 12 seers a day, working day and night (Rajguru, 1988). They smelted iron from ferruginous clay in the different sites of Assam. The people who engaged themselves to produce iron from the mines were known as Lo-salia. Their business was to produce iron only and not blacksmith (Rajguru, 1988). However, the whole process of iron smelting was a rude one. For the purpose of iron smelting, a machine having flops and charcoal fires were mainly used. In the process of iron smelting, the smelters dug the dunes and the mines and then removed the clay iron ores. Thereafter they deposited these iron ores in the small ponds and each pond measured 18 ft. by 10 1/2 ft. and 6 ft. deep and pounded them with their feet for 12 days. 'The crude iron ores so acquired was first put into fire of thatch and then placed in an iron trough and burnt in strong fire. In the process, the dirt came out in the form of foam and the iron content formed into a lump. The lump was divided into equal parts, each of which was beaten or put into impressors to give the shape of long flat bars' (Baruah, 1995). Thus, the iron was smelted by the smelter workers during the medieval period. But it is interesting to note here that the technique of iron smelting followed by the Khasis was more improved than the technique of the Assamese. In fact, the Khasi hills was famous for the abundance of iron ore during the medieval period. In the Khasi hills, several tools and instruments like U-Sdie (a rough axe), Narsuh (a iron bar), Kar Jingthap (iron bat) etc. were used during the process of iron smelting.

**Table 1 : Number of Persons Required in Iron Extraction**

| Nature of Work                    | Number of Persons | Days | Total Numbers of Persons |
|-----------------------------------|-------------------|------|--------------------------|
| In searching iron mixed sand bank | 6                 | 5    | 30                       |
| In digging of soil                | 6                 | 15   | 90                       |
| In separating iron mixed soil     | 6                 | 11   | 66                       |
| In Burning                        | 6                 | 30   | 180                      |
| Melting iron mixed soil           | 5                 | 20   | 100                      |

Source: Sharma, B., 2007 & Borboruah, H., 2013.

Besides these metal technologies in the medieval period, Assam had a very popular for its bell-metal and brass works. The bell metal workers were known as Kahar (early Assamese Kamsyakara). They mainly produced the necessary household utensils like dish (kahi), cup (bati), water-jug (lota-ghati) and other utensils (Sarma, 2001). Similarly, the chronicles also gives information about the use of silver in the medieval Assam. Silver was obtained from lead ores from various places of Assam. But it is interesting note here that copper was not found in Assam. It was exported from outside Assam, mainly from China. However, copper was extensively used by Assamese people. There are a very large number of copper plate inscriptions belonging to both ancient and medieval period (Baruah, 1995).

### 4. CONCLUSION

The above discussion indicates that there is growing evidence to prove that medieval metallurgists of Assam

have also made major contribution to development of metal craft technologies in Assam. It has been clearly seen in case of gold washing and iron smelting technologies, metallurgists contributed significantly to their metallurgical advances in the medieval period. Moreover, traditional metallurgy was an important aspect of the culture of Assam during the medieval period. It is concluded that the medieval metallurgical technology of Assam acquires itself with glory.

### 5. ACKNOWLEDGMENT

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